

13. The method of claim 1, wherein selecting the subset of the subcomponents includes selecting a subcomponent in the subset of subcomponents based upon a degree of overlap of spectral energy, in the subcomponent, with expected spectral energy of the QRS complex of the ECG.

14. An apparatus comprising:

a computer-based circuit configured and arranged with a plurality of modules for identifying a QRS complex in an electrocardiogram (ECG), the modules including a decomposing module configured and arranged to decompose the ECG into subcomponents;

a selection module configured and arranged to select a subset of the subcomponents based upon a degree of overlap of spectral energy, in at least one of the subcomponents, with expected spectral energy of the QRS complex of the ECG;

a combiner module configured and arranged to combine at least two of the subcomponents in the subset;

a comparator module configured and arranged to compare the combined subcomponents to a threshold; and

an identifier module configured and arranged to identify the location of the QRS complex in the ECG based on the comparing.

15. The apparatus of claim 14, further comprising a threshold module configured and arranged to compute the threshold based upon an estimated level of noise energy in an isoelectric portion of the ECG.

16. The apparatus of claim 15, wherein the threshold module is configured and arranged to estimate the level of noise energy using one of variance, zero crossings, and amplitudes of peaks and valleys in the ECG.

17. The apparatus of claim 14, further comprising a threshold module configured and arranged to compute the threshold by:

selecting a subset of noise subcomponents based upon a portion of subcomponent spectral energy attributable to expected noise spectral energy in the ECG;

combining at least two of the noise subcomponents; and setting the threshold based upon the combination of the at least two of the noise subcomponents.

18. The apparatus of claim 17, wherein the selection module is configured and arranged to select the subset of noise subcomponents based upon a portion of subcomponent spectral energy attributable to expected noise spectral energy in the ECG by selecting a subset of noise subcomponents based

upon a portion of subcomponent spectral energy attributable to expected noise spectral energy in a portion of the ECG that excludes the QRS complex.

19. The apparatus of claim 17 wherein the threshold module is configured and arranged to combine at least two of the noise subcomponents by combining noise subcomponents of a portion of the ECG outside the QRS complex.

20. The apparatus of claim 17, wherein the threshold module is configured and arranged to select the subset of noise subcomponent based upon a portion of subcomponent spectral energy attributable to noise spectral energy that is at least one-half of the total energy of the subcomponent.

21. The apparatus of claim 17, wherein the threshold module is configured and arranged to combine the at least two of the noise subcomponents by computing one of a point-wise product of the at least two of the noise subcomponents, a linear combination of the at least two of the noise subcomponents, and a cross-correlation of the at least two of the noise subcomponents.

22. The apparatus of claim 14, wherein the combiner module is configured and arranged to combine the at least two of the subcomponents by computing one of a point-wise product of the at least two of the subcomponents, a linear combination of the at least two of the subcomponents, and a cross-correlation of the at least two of the subcomponents.

23. The apparatus of claim 14, wherein the decomposing module is configured and arranged to decompose the ECG into subcomponents by generating time-synchronized subcomponents.

24. The apparatus of claim 23, wherein the decomposing module is configured and arranged to generate the time-synchronized subcomponents by applying a transform to the ECG, the transform including one of: a non-orthogonal wavelet transform, an undecimated wavelet transform, a stationary wavelet transform, and a shift-invariant wavelet transform.

25. The apparatus of claim 14, wherein the selection module is configured and arranged to select the subset based upon a degree of overlap of the spectral energy that is at least one-half.

26. The apparatus of claim 14, wherein the selection module is configured and arranged to select the subset by selecting each of the subcomponents in the subset based upon a degree of overlap of spectral energy, in the subcomponent, with expected spectral energy of the QRS complex of the ECG.

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